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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/702,435	11/07/2003	Kazuyuki Miyashita	245258US90CONT	9403

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OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER	
STOCK JR, GORDON J	

ART UNIT	PAPER NUMBER
2877	

DATE MAILED: 05/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/702,435	MIYASHITA ET AL.	
	Examiner	Art Unit	
	Gordon J. Stock	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 May 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-67* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *16-27, 50-59, 62,63,66,67* is/are allowed.

6)☒ Claim(s) *1-15,28-49,60,61,64 and 65* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *27 May 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *20040204*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings and Specification

1. The drawings and specification are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference character(s) not mentioned in the description: **IX** of Fig. 2; $\mathbf{DA_{13,23}}$ of Fig. 8; **710** of Fig. 12. Corrected drawing sheets in compliance with 37 CFR 1.121(d), or amendment to the specification to add the reference character(s) in the description in compliance with 37 CFR 1.121(b) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: $\mathbf{DA_{14,23}}$ of Fig. 8 (page 72 line 4); $\mathbf{p_0}$' to $\mathbf{p_3}$' in Figs 15b and Fig. 18 (page 84 lines 10 and 16); . Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR

1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. The specification is objected to for the following: on page 51 line 24 "senor" should read --sensor--; on page 113 line 2 "boarder" should read –-border--; on page 116 line 3 "Fig. 21" should read --Fig. 21c--; on page 159 line 7 "wit" should read –with--; and throughout the disclosure the term 'datums' should read –data-- such as on line 6 of page 112 and line 14 of page 120. Corrections required.

4. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. **Claims 1-15, 28-49, 60, 61, 64, 65** are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. A broad range or limitation together with a narrow range or limitation that falls within the broad range or limitation (in the same claim) is considered indefinite, since the resulting claim does not clearly set forth the metes and bounds of the patent protection desired. See MPEP § 2173.05(c). Note the explanation given by the Board of Patent Appeals and Interferences in *Ex parte Wu*, 10 USPQ2d 2031, 2033 (Bd. Pat. App. & Inter. 1989), as to where broad language is

followed by "such as" and then narrow language. The Board stated that this can render a claim indefinite by raising a question or doubt as to whether the feature introduced by such language is (a) merely exemplary of the remainder of the claim, and therefore not required, or (b) a required feature of the claims. Note also, for example, the decisions of *Ex parte Steigewald*, 131 USPQ 74 (Bd. App. 1961); *Ex parte Hall*, 83 USPQ 38 (Bd. App. 1948); and *Ex parte Hasche*, 86 USPQ 481 (Bd. App. 1949). In the present instance, **claims 1 and 28** recites the broad recitation "rectangular shaped first area," and the claim also recites "in general made up of a plurality of divided areas arranged in a matrix shape" which is the narrower statement of the range/limitation. **Claims 2-14, 29-49, 60, 61, 64, 65** are rejected for being dependent upon a rejected base claim.

8. In addition, as for **claim 28**, the phrase, "size equal to said light transmitting section and under" is indefinite, for it is unclear how a step pitch can equal two different sizes.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. **Claims 1-7, 14, 15, 28-33, 48, 49, 60, 61, 64, 65**, are rejected under 35 U.S.C. 103(a) as being unpatentable over **Kroko (4,759,626).**

As for **claims 1-3**, Kroko discloses in a determination of best focus for step and repeat projection aligners teaches a first step in which a rectangular shaped first area made up of a plurality of divided area arranged in a matrix shape is formed on a wafer (Figs. 5-7); being

sequentially transferred onto said object arranged on a reticle being sequentially transferred onto said object, wafer while at least one exposure condition is changed (col. 3, lines 30-45; col. 4, lines 10-15 and 40-66); a second step in which an overexposed second area is formed in an area on said object that is at least part of the periphery of said first area (col. 2, line 45-55); a third step in which a formed state of an image of said measurement pattern in a plurality of divided areas that are at least part of said plurality of divided areas making up said first area is detected and optical properties are obtained based on results of detection (col. 5, lines 15-25); wherein said second step is performed prior to said first step is suggested by the particular order of the focus exposure matrix, the sequence of exposure settings (Fig. 2); wherein said overexposed area may be slightly larger than said first area and part of a rectangular frame shaped area (Figs. 5-7; col. 2, line 45-55); as for the first surface being transferred on said object arranged on said second surface side of said projection optical system, Kroko does not explicitly state this but he discloses the transfer of a pattern from a reticle by the projection system to the wafer (col. 3, lines 30-40). Examiner takes official notice that it is well-known in a projection exposure system that reticle's pattern is transferred via a projection lens system to print on a wafer surface. Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the first surface's pattern, reticle pattern, projected through the projection system to the wafer side of the projection optical system in order to have the reticle pattern properly exposed to the wafer.

As for **claim 4**, Kroko discloses everything as above (see **claim 1**). In addition, said second area is formed by transferring a predetermined pattern on said wafer (col. 4, lines 40-66). Kroko, again, does not explicitly that a pattern is formed by transferring a predetermined pattern

arranged on said first surface onto said object arranged on said second surface side of said projection optical system, but discloses transfer of a pattern from a reticle by the projection system of to the wafer (col. 3, lines 30-40; col. 4, lines 55-60). Examiner takes official notice that it is well-known in a projection exposure system that reticle's pattern is transferred via a projection lens system to print on a wafer surface. Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the first surface's pattern, reticle pattern, projected through the projection system to the wafer side of the projection optical system in order to have the reticle pattern properly exposed to the wafer.

As for **claims 5-6**, Kroko discloses everything as above (see **claim 1**). In addition, said predetermined pattern is rectangular shaped (col. 4, lines 40-45); wherein these lines are transferred by scanning exposure method (col. 4, lines 55-57). Kroko, again, does not explicitly that a pattern is formed by transferring a predetermined pattern arranged on said first surface onto said object arranged on said second surface side of said projection optical system, but discloses transfer of a pattern from a reticle by the projection system of to the wafer (col. 3, lines 30-40; col. 4, lines 55-60). Examiner takes official notice that it is well-known in a projection exposure system that reticle's pattern is transferred via a projection lens system to print on a wafer surface. Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the first surface's pattern, reticle pattern, projected through the projection system to the wafer side of the projection optical system in order to have the reticle pattern properly exposed to the wafer.

As for **claim 7**, Kroko discloses everything as above (see **claim 1**). In addition, he discloses pattern sequentially transferred with an overexposed exposure amount (col. 4, lines 55-

60; col. 5, lines 25-30). Kroko, again, does not explicitly that a measurement pattern is formed by transferring a predetermined pattern arranged on said first surface onto said object arranged on said second surface side of said projection optical system, but discloses transfer of a pattern from a reticle by the projection system of to the wafer (col. 3, lines 30-40; col. 4, lines 55-60). Examiner takes official notice that it is well-known in a projection exposure system that reticle's pattern is transferred via a projection lens system to print on a wafer surface. Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the first surface's pattern, reticle pattern, projected through the projection system to the wafer side of the projection optical system in order to have the reticle pattern properly exposed to the wafer.

As for **claim 14**, Kroko discloses everything as above (see **claim 1**). And Kroko discloses that the exposure conditions are focus and exposure energy amount (col. 3, lines 35-37).

As for **claim 15**, Kroko discloses everything as above (see **claim 1**). And Kroko further discloses transferring said measurement pattern sequentially (col. 4, lines 10-20 and lines 40-60); while changing focus and exposure (col. 3, lines 33-40); detecting said formed state with image availability, resist missing or not, in said at least part of said plurality of divided areas detected (col. 5, lines 15-30); optical properties, best focus is decided from correlation between exposure and focus position with image detected (col. 5, lines 19-45).

As for **claim 28**, Kroko discloses in a determination of best focus for step and repeat projection aligners teaches a first step in which a rectangular shaped first area made up of a plurality of divided area arranged in a matrix shape is formed on a wafer (Figs. 5-7); being sequentially transferred onto said object arranged on a reticle being sequentially transferred onto

said object (col. 3, lines 30-45; col. 4, lines 10-15 and 40-66) with a step pitch whose distance corresponds to the size equal to the light transmitting section and under the distance, 4mm with smaller steps for better focus resolution (col. 4, lines 35-40); a second step in which a formed state of an image of said measurement pattern in a plurality of divided areas that are at least part of said plurality of divided areas making up said predetermined area is detected and optical properties are obtained based on results of detection (col. 5, lines 15-25); wherein said second step is performed prior to said first step is suggested by the particular order of the focus exposure matrix, the sequence of exposure settings (Fig. 2); wherein said overexposed area may be slightly larger than said first area and part of a rectangular frame shaped area (Figs. 5-7; col. 2, line 45-55); as for the first surface being transferred on said object arranged on said second surface side of said projection optical system, Kroko does not explicitly state this but he discloses the transfer of a pattern from a reticle by the projection system to the wafer (col. 3, lines 30-40). Examiner takes official notice that it is well-known in a projection exposure system that reticle's pattern is transferred via a projection lens system to print on a wafer surface. Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to have the first surface's pattern, reticle pattern, projected through the projection system to the wafer side of the projection optical system in order to have the reticle pattern properly exposed to the wafer.

As for **claims 29-30**, Kroko discloses everything as above (see **claim 28**). In addition, he discloses, said formed state of said image is detected visually (col. 5, lines 15-25); and the stepping creates contact or overlap on said object to create a parabolic pattern (col. 4, lines 55-67; col. 5, lines 1-17).

As for **claims 31-32**, Kroko discloses everything as above (see **claims 28 and 30**). He discloses also a photosensitive layer made of a positive type photoresist, an image is formed through development process; with stepping is set so that resist layers are removed by development process (col. 4, line 55-67; lines 8-35).

As for **claim 33**, Kroko discloses everything as above (see **claim 28**). In addition, Kroko discloses an energy amount is changed located on outermost portions are overexposed (col. 2, lines 55-60; col. 5, lines 25-31).

As for **claim 48**, Kroko discloses everything as above (see **claim 28**). And Kroko discloses that the exposure conditions are focus and exposure energy amount (col. 3, lines 35-37).

As for **claim 49**, Kroko discloses everything as above (see **claim 28**). And Kroko further discloses transferring said measurement pattern sequentially (col. 4, lines 10-20 and lines 40-60); while changing focus and exposure (col. 3, lines 33-40); detecting said formed state with image availability, resist missing or not, in said at least part of said plurality of divided areas detected (col. 5, lines 15-30); optical properties, best focus is decided from correlation between exposure and focus position with image detected (col. 5, lines 19-45).

As for **claims 60-61**, Kroko discloses everything as above (see **claim 1**). He does not explicitly state an adjusting step and transferring step via adjusted optical system. However, he states determining best focus that is employed in wafer processing runs to expose and pattern wafers (col. 1, lines 5-11; col. 7, lines 30-35). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to adjust the projection system to the best focus setting as determined in the optical properties measurement method for exposing wafers in order

to provide optimal exposure conditions for pattern formation on the wafer by the projection system.

As for **claims 64-65**, Kroko discloses everything as above (see **claim 28**). He does not explicitly state an adjusting step and transferring step via adjusted optical system. However, he states determining best focus that is employed in wafer processing runs to expose and pattern wafers (col. 1, lines 5-11; col. 7, lines 30-35). Therefore, it would be obvious to one of ordinary skill in the art at the time the invention was made to adjust the projection system to the best focus setting as determined in the optical properties measurement method for exposing wafers in order to provide optimal exposure conditions for pattern formation on the wafer by the projection system.

Allowable Subject Matter

11. **Claims 16-27, 50-59, 62, 63, 66, 67** are allowed.

Claims 8-13 and 34-47 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

As to **claim 8**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an optical properties measurement method each position is calculated for said plurality of divided areas making up said first area, with part said second area as datums, in combination with the rest of the limitations of **claim 8.**

As to **claim 9**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an optical properties measurement method said first area is detected by a template matching method in combination with the rest of the limitations of **claim 9.**

As to **claim 10**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an optical properties measurement method "detected with a representative value related to pixel data of each of said divided areas obtained by imaging serving as a judgment value," in combination with the rest of the limitations of **claim 10-13.**

As to **claim 16,** the prior art of record, taken alone or in combination, fails to disclose or render obvious in an optical properties measurement method "pattern are spaced apart at a distance greater than a distance which keeps contrast of an image of said multibar pattern from being affected by said adjacent pattern" in combination with the rest of the limitations of **claims 16-27, 62, 63.**

As to **claim 34**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an optical properties measurement method the particular outer frame detection and calculation step in combination with the rest of the limitations of **claims 34-42.**

As to **claim 43**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an optical properties measurement method "first area is detected by a template matching method" in combination with the rest of the limitations of **claim 43.**

As to **claim 44**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an optical properties measurement method "detected with a representative value related to pixel data of each of said divided areas obtained by imaging serving as a judgment value" in combination with the rest of the limitations of **claims 44-47.**

As to **claim 50**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an optical properties measurement method "using a representative value

related to pixel data for each area" in combination with the rest of the limitations of **claims 50-59, 66, 67.**

Conclusion

Several facts have been relied upon from the personal knowledge of the examiner about which the examiner took Official Notice. Applicant must seasonably challenge well known statements and statements based on personal knowledge when they are made by the Board of Patent Appeals and Interferences. In re Selmi, 156 F.2d 96, 70 USPQ 197 (CCPA 1946); In re Fischer, 125 F.2d 725, 52 USPQ 473 (CCPA 1942). See also In re Boon, 439 F.2d 724, 169 USPQ 231 (CCPA 1971) (a challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice). If applicant does not seasonably traverse the well-known statement during examination, then the object of the well known statement is taken to be admitted prior art. In re Chevenard, 139 F.2d 71, 60 USPQ 239 (CCPA 1943). A seasonable challenge constitutes a demand for evidence made as soon as practicable during prosecution. Thus, applicant is charged with rebutting the well-known statement in the **next reply** after the Office action in which the well known statement was made.

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and

2) Should be unsigned by the attorney or agent.

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: **(703) 872-9306**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431. The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached at 571-272-2800 ext 77.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

gs
May 15, 2005

Layla Lauchman
Primary Examiner
Art Unit 2877